9 PAPER EXAMINATIONS

9.1 Objective

To determine whether two or more items of paper could have been derived from the same source; or to determine if two or more fragments of paper could have been joined together at one time.

9.2 References

- Conway, James V.P.; Evidential Documents; Charles C. Thomas Publisher, 1959
- Harrison, Wilson R.; Suspect Documents (Second Edition); Sweet & Maxwell Ltd., 1966
- Ellen, David; The Scientific Examination of Documents (Second Edition); Taylor & Francis Ltd., 1997
- Hilton, Ordway; Scientific Examination of Questioned Documents (Revised Edition); Elsevier, 1982
- Saferstein, Richard; Criminalistics, An Introduction to Forensic Science; Prentice-Hall Inc., 1977
- Brunelle, Richard L. & Reed, Robert W.; Forensic Examination of Ink and Paper; Charles C. Thomas Publisher, 1984
- Foster & Freeman Ltd.; Instruction Manual for the Electrostatic Detection Apparatus (ESDA)

9.3 Equipment

- Light source
- Stereo microscope
- Magnifier
- Transmitted light box
- UV light source
- VSC-2000 Video Spectral Comparator
- DOYA IR Video Analyzer
- Micrometer
- Linear measuring device(s) (e.g. ruler)
- ESDA

9.4 Safety Measures

Precautionary measures specified in Section 1.3 when working with a UV light source. Precautionary measures due to the high voltage of the ESDA are contained in the Manufacturer's Operating Instructions Manual.

9.5 Interferences

9.5.1 During the paper manufacturing process reams of paper are often comprised of sheets from one or more rolls of paper that are combined prior to the cutting process. For this reason, dissimilarities in areas such as color, brightness, fluorescence, opacity, thickness, and surface texture, could exist within sheets from the same ream.

9.5.2 Storage conditions (e.g. exposure to light, heat, moisture) can affect the appearance of paper during certain tests.

9.6 Procedures

9.6.1 These procedures may not address any uncommon or unusual circumstances that may be encountered during examinations.

9.6.2 The procedures outlined below may not be possible or necessary in every case.

9.6.3 Compare the dimensions (width, length, and thickness) of the papers. Evaluate the significance of any similarities or dissimilarities. (**Note:** Measurements shall be relative rather than absolute, meaning that the purpose is only to determine whether the items being compared have similar or dissimilar dimensions. Any measurements must all be taken at the same time under the same conditions.)

9.6.4 Compare the color of the papers. Evaluate the significance of any similarities or dissimilarities.

9.6.5 Compare the opacity of the papers. Evaluate the significance of any similarities or dissimilarities.

9.6.6 Compare any surface printing (e.g. ruled lines) on the papers. Examine microscopically for any possible defects that might be in common. Evaluate the significance of any similarities or dissimilarities.

9.6.7 Compare any watermarks on the papers. Evaluate the significance of any similarities or dissimilarities.

9.6.8 Compare the surface morphology (texture) of the papers. Evaluate the significance of any similarities or dissimilarities.

9.6.9 Compare the shapes of the corners of the papers (e.g. squared, curved, rough finish). Evaluate the significance of any similarities or dissimilarities.

9.6.10 Compare any security features (e.g. colored fibers, planchettes) on the papers. Evaluate the significance of any similarities or dissimilarities.

9.6.11 Compare any remnants of adhesive binding or padding if either is present on the edges of the papers. Evaluate the significance of any similarities or dissimilarities.

9.6.12 Examine papers with oblique light for any surface damage common to both (e.g. folds, creases, paperclip marks, staple holes, crimp markings, indented writing). Processing with the ESDA should be considered since it could disclose indented writing and other marks which were not visible during the side light exam. Evaluate the significance of any similarities or dissimilarities.

9.6.13 Compare any perforations or microscopic striae that might be present on the edges of the papers. Evaluate the significance of any similarities or dissimilarities.

9.6.14 Compare the fluorescent properties of the papers using a UV light source (long and short wave). Evaluate the significance of the similarities or dissimilarities.

9.6.15 Examine the papers with the VSC-2000. Compare the results of the IR absorbance, reflectance and luminescent properties; as well as those detected utilizing the UV light source. Evaluate the significance of any similarities or dissimilarities. (**Note**: DOYA IR Analyzer may also be used, especially in cases where the size or shape of the documents is such that the open architecture of the DOYA is necessary. Although there will undoubtedly be situations where either instrument will yield adequate results, the VSC-2000 has a broader range of capabilities, and for this reason should be the initial instrument of choice. Papers which cannot be differentiated on the DOYA shall be examined with the VSC-2000 (if possible) before reporting any conclusions on the CoA.)

9.6.16 If reconstructing torn or cut paper fragments, match irregularly torn edges and/or make microscopic matches of cut/torn paper fibers.

9.6.17 Consider the significance of observations in 9.6.3 through 9.6.16, both individually and in combination, and form a conclusion within any appropriate limitations.

9.6.18 Destructive exams (e.g. paper fiber analysis) will generally be referred to the Trace Evidence Section.

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